REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections set forth in the above-identified Office Action are respectfully requested.

The thoroughness of Examiner Butler's review of this application is appreciated. By this Amendment, independent claims 1 and 12 have been amended to recite a preferred aspect of the invention, namely that the air circulation in the forced convention air oven is in a turbulent state. Support for this feature appears, for example, at page 7, line 20.

In addition, new claims 25-34 have been added to define certain features of Applicants' invention. Claim 25 recites a certain mass throughput of the yarn through the oven, support for which appears, for example, at page 11, Table 1, Example 3. Similarly, claims 26-28 recite other preferred mass throughputs of the yarn through the oven, support for which appears, for example, at page 9, lines 10-14. Claim 29 is similar to previous claims 1 and 12 and further recites that the mass throughput of the yarn through the oven is more than 0.5 grams/minute per yarn end. Dependent claim 30 is similar to new claim 27. Dependent claim 31 also recites that the air circulation in the oven is in a turbulent state. Dependent claim 32 recites that the feed yarn is in an essentially undrawn state prior to passing into the oven. Support for this feature appears, for example, at page 6, lines 28-30. New claim 33 recites that the process includes the steps of winding up the feed yarn on a creel and subsequently feeding the feed yarn from the creel into the oven. Support for this feature appears, for example, at page 8, lines 5 to 11 and page 10, lines 26-28. Finally, new claim 34 is a combination of previous claims 1 and 12, but of the consisting essentially format.

Following this Amendment, there are presently pending claims 1-3, 5-14, 16-22 and 25-34. Applicants respectfully submit that all of the claims are patentable and should be allowed.

With regard to the comments in the above-identified Office Action concerning certain publications that were not considered, it appears that a copy of EP 0 320 188 A2 was inadvertently omitted from the Information Disclosure Statement. For completeness, attached is a copy of that publication.

Regarding document JP-A-60/52647 which was not considered as an English language translation or a concise explanation of its relevance were not provided in the previously submitted IDS, for completeness attached hereto is a translation of such publication.

Turning now to the rejections, claims 1-3 and 5-11 were provisionally rejected on the ground of obviousness-type double patenting over claims 1-3 and 5-7 of copending application Serial Number 11/205,952. This rejection was provisionally made as the referenced application has not issued as a patent.

Applicants respectfully submit that the present claims are clearly patentable over the cited claims of the copending application and therefore request that such rejection be withdrawn. Alternatively, such rejection may be obviated in the future by filing a terminal disclaimer.

It is respectfully pointed out that although claim 10 was included in the summary of the double patenting rejection, the rejection did not address this specific claim.

Claims 1-3, 5-8, 10-14, 16-19, 21 and 22 were rejected under 35 USC 102 (b) as being anticipated by Kavesh et al. (USP 4,551,296). This rejection is respectfully traversed.

The present invention is directed to a process for drawing gel-spun multi-filament polyethylene yarn which has reduced denier and increased yarn properties, and these properties are achieved with enhanced efficiency, productivity and lower cost. The process includes drawing a feed yarn, preferably in an essentially undrawn state, and which feed yarn has certain properties (e.g., intrinsic viscosity of the polyethylene and tenacity of the yarn as claimed). The yarns are drawn in a forced convection air oven under certain narrowly defined conditions, and the air in the oven is in a turbulent state. The conditions of drawing are set forth in the equations that appear in the claims and in the specification. These equations interrelate the length of the oven, the entrance speed and exit speed, the yarn draw rate and the nominal residence time in the oven. In addition, preferably the productivity of the process is more than certain amounts as recited in the claims. It is respectfully submitted that these features as claimed are not taught or suggested by Kavesh et al.

It was stated in the rejection that Kavesh et al. disclose in claim 1 extracting the first and second solvent from the filament – "fewer than two methyl groups per thousand carbon atoms and less than 2 wt. % of other constituents". However, it is respectfully pointed out that the phrase in the instant claims "fewer than two methyl groups per thousand carbon atoms, and less than 2 wt. % of other constituents" refers to the characteristic of the polyethylene comprising the yarn, and not to any residual solvent or material in the yarn after extraction. It can be seen that claim 1 of Kavesh et al. does not disclose this feature as claimed herein.

The rejection further relies on certain disclosures in Kavesh et al. as allegedly showing the herein-claimed invention. In particular, Example 533 was cited. It is respectfully pointed out that with regard to certain examples, including Example 533, it is stated in Kavesh et al. that "All stretching was done in a hot tube blanketed with nitrogen" (see column 23, lines 46-47, emphasis added). There is nothing stated with respect to Example 533 about the length of the hot tube. Although a length of 1.5 meters is disclosed at column 17, line 28, this is with respect to Examples 111-486 and not with respect to Example 533. It is respectfully submitted that an anticipation rejection cannot be predicated on merely selecting discrete disclosures from a reference, without placing them in proper relation.

In the rejection of claim 1, certain assumptions were made including some conditions of Example 533 of Kavesh et al. It is noted that a minor error appears in the first equation appearing on page 5 of the Office Action; in the parenthetical phrase "L" should be "L/V_1".

It was stated with respect to the rejection of claim 1 that:

> "The air inside the tube would necessarily be, and [sic, at] least to some degree, a forced convection at the surface fiber because the fiber is moving relative to the tube's air (forced air movement at the surface of the fiber) and has a temperature gradient to the air in the tube (convection via the temperature difference between the air and the moving fiber)."

In response, it is first respectfully pointed out that the cited portions of Kavesh et al. do not refer at all to an air oven. Rather, in each situation the stretching was done in a blanket of nitrogen. See, for example, column 23, lines 46-47 which refer to the conditions of Example 533 relied on in the rejection. Likewise, the reference to column

17, line 28 states that the hot tube is blanketed with nitrogen. Also, the citation to column 25, lines 12-40 relates back to the statement at column 23, lines 46-47 that the tube was blanketed with nitrogen. Consequently, it is seen that the citations relied on in Kavesh et al. do not disclose a process wherein the drawing is done in air, much less a forced convection air oven.

It is also respectfully submitted that the hot tube of Kavesh et al. is not a forced convection oven as claimed herein. The generally understood meaning of forced convection is fluid motion "... set up by some external source such as a blower...". See Eckert and Drake, "Heat and Mass Transfer", McGraw-Hill Book Company, 1959, page 121 which is attached hereto. In contrast, there is no such blower or other external source disclosed in Example 533 of Kavesh et al.

Thus, it is submitted that the process steps claimed in claim 1 are not disclosed in Kavesh et al. and thus an anticipation rejection under 35 USC 102 (b) is not proper. Likewise, it is submitted that claim 1 is not obvious over the disclosure of Kavesh et al.

Claim 1 now further recites that the air circulation in the oven is in a turbulent state. This feature is likewise submitted to be absent from the disclosure of Kavesh et al., and claim 1 is submitted to be patentable over such reference for this additional reason.

With regard to the rejection of claim 2, it was stated that the yarn for Example 533 was 216 denier and 48 filaments. The rejection then computes a mass throughput which results in a level significantly below that claimed in claim 2 (0.06 g/min vs. at least 0.25 g/min claimed). However, the rejection goes on to state that Kavesh et al. teaches the production of yarns of 16, 120 and 240 filaments (citing column 7, lines 57-59).

Although Kavesh et al. discloses at that location that the number of apertures may be 16, 120 or 240, there is nothing to suggest that the number of filaments in Example 533 should be anything other than the 48 filaments clearly stated in that example. It is respectfully submitted that it is improper to create an example in Kavesh et al. by selecting portions of its disclosure and then rearranging the data. It is submitted that the generic disclosure of a number of apertures cannot be said to create an anticipation by mixing and matching with certain specific examples in Kavesh et al. Indeed, by substituting the various number of filaments that the rejection suggests are disclosed in Kavesh et al. results in a mass throughput which is lower for two of the proposed yarns than the limit of claim 2.

Furthermore, it is respectfully submitted that there is no reason to assume that the drawing speeds (V_1 and V_2) of a 240 filament yarn would be identical to those for the 48 filament yarn of Example 533 of Kavesh. A greater number of filaments in a yarn also means greater filament-to-filament variation of denier and tensile properties within a yarn. Consequently, it is generally necessary to draw a yarn having a greater number of filaments at a slower speed in order to achieve the same degree of stretch as with a yarn having a smaller number of filaments. To assume that the mass throughput of a drawing operation would scale in linear proportion to the number of filaments in a yarn is submitted to be an incorrect assumption, and not based on any fact set forth in the rejection.

Accordingly, it is respectfully submitted that Kavesh et al. does not anticipate claim 2 or render claim 2 obvious.

With respect to the rejections of claims 5 and 11, it was stated, *inter alia*, that Kavesh et al. discloses extracting the first and second solvent, with fewer than one methyl

group per thousand carbon atoms and less than 1 wt. % of other constituents, citing claim 1 of Kavesh et al. As pointed out in the above discussion of the rejection of claim 1 of this application, the phrase referred to relates to the properties of the starting polyethylene, and does not depend on the extraction of solvent. These claims are likewise submitted to be patentable over Kavesh et al.

With regard to the comments made concerning claims 6-8 that the "feed yarn" of Example 533 has a tenacity within the claimed range based on the tenacity of the yarn of Example 523 of Kavesh et al., it is pointed out that Example 523 is a stretched yarn. The tenacity of the feed yarn for Example 523 is not stated in Example 502. In contradistinction to the double stretching of Example 533, new claims 32 and 33 clearly state that the feed yarn is either in an essentially undrawn state or is wound up and then fed from a creel (and is thus undrawn).

With regard to the rejection of claim 12, it appears that Example 529 of Kavesh et al. is being relied on, but some of the data in the calculations on page 7 of the Office Action appear to be from Example 533 rather than Example 529, and other erroneous data is indicated. Thus, the exit velocity V_2 is said to be 1.75 m/min, whereas a figure of 1.5 is employed in the equations. Likewise, a value of 2.5 m/min is shown for V_2 in the third and fourth equations on page 7, whereas it appears that V_2 should be 1.5 m/min.

Even if these errors were corrected, it is respectfully submitted that claim 12 is patentable at least for the same reasons as mentioned for claim 1. In summary, Kavesh et al. does not disclose drawing a feed yarn in air, and not in a forced convection air oven, and not where the air circulation in such oven is in a turbulent state. Consequently, claim 12 is likewise submitted to be neither anticipated by Kavesh et al. nor rendered obvious from its disclosure.

With regard to the rejection of claim 13, the Office Action makes a similar assumption regarding the number of filaments and then calculates theoretical mass throughputs for such filament numbers. An error is also noted in the first calculation on page 8 of the rejection in that the denier of Example 529 was 366 as opposed to 216 stated therein. For the same reasons as mentioned with respect to claim 2, it is submitted that the basis of this rejection is improper and that claim 11 is likewise patentable.

With regard to the rejection of claims 16 and 22, the same comments as made regarding claims 5 and 11 are equally applicable to such claims.

For the above reasons, it is respectfully submitted that none of claims 1-3, 5-8, 10-14, 16-19, 21 and 22 are anticipated by Kavesh et al. Moreover, it is submitted that these claims are not obvious over Kavesh et al. Therefore, Applicants respectfully request reconsideration and withdrawal of these rejections.

Claims 9 and 20 were rejected under 35 USC 103 (a) as being unpatentable over Kavesh et al. These rejections are also respectfully traversed.

It was stated that the tenacity of the feed yarn as applied against claim 5 was 21 g/d and further that Kavesh et al. teach that increased drawing provides for increased tenacity, with reference to columns SR and Ten g/d in the table in column 25 of Kavesh et al. However, it is respectfully submitted that it is improper to make such a conclusion from the data in Examples 523 to 533 of Kavesh et al. since none of them compare stretching on yarn of the same denier. Consequently, it is submitted that the data relied on do not support the hypothesis upon which the rejection is based. Clearly there is no

suggestion in Kavesh et al. of using a feed yarn that has a tenacity of from 26 g/d to 46 g/d in a drawing operation as claimed in claim 9, and the process of the claims from which claim 9 depends. Accordingly, claim 9 is likewise submitted to be patentable.

Claim 20 was rejected on grounds similar to that used against claim 9, but with the conclusion that it would it would have been obvious to use higher tenacity feed yarn in Example 529 of Kavesh et al. Applicants submit that this conclusion is also in error, for the same reasons as stated with respect to claim 9. Therefore, claim 20 is also submitted to be patentable.

Accordingly, reconsideration and withdrawal of the 35 USC 103 rejections of claims 9 and 20 are respectfully requested.

Applicants respectfully submit that new claims 25-34 are also patentable over Kavesh et al. With regard to claims 25-28, these claims include the feature that the mass throughput of the yarn is at least 0.42, 0.5, 1 and 4 grams/minute per yarn end, respectively. It is submitted that this feature is not at all disclosed in Kavesh et al. in a process as claimed in claim 1. There is nothing to suggest that Kavesh et al. could or should be modified to provide a process wherein the mass throughput is within the ranges claimed in claims 25-28. Accordingly, it is respectfully submitted that claims 25-28 are further patentable over the applied reference.

Likewise, new independent claim 29 calls for the mass throughput to be more than 0.5 grams/minute per yarn end. Dependent claim 30 recites that the mass throughput is more than 1 gram/minute per yarn end. These features are neither taught nor suggested in Kavesh et al. Claims 29 and 30 are therefore also submitted to be further patentable over Kavesh et al.

Dependent claim 31 calls for the air circulation in the oven to be in a turbulent state and is submitted to be patentable over Kavesh et al. for this additional reason, as was explained above with respect to claim 1.

As alluded to earlier, dependent claim 32 recites that the feed yarn is in an essentially undrawn state prior to passing into the oven. This feature is likewise not taught or suggested by Kavesh et al. and hence claim 32 is submitted to be further patentable over the Kavesh et al. patent.

Dependent claim 33 recites that the feed yarn is wound up on a creel and then subsequently feed from the creel to the oven. As this feature is not disclosed or suggested in Kavesh et al., it is respectfully submitted that claim 33 is also further patentable over the Kavesh et al. patent.

Finally, claim 34 recites a process in which the steps consist essentially of the enumerated steps, and that the process conditions are selected such that at least one of two sets of conditions are met. In this regard, claim 34 is similar to claim 29. Claim 34 is submitted to be patentable over Kavesh et al., at least for the reasons that Kavesh et al. does not disclose passing a feed yarn into a forced convection air oven. As pointed out above, Kavesh et al. disclose a nitrogen blanket in its heated tube, not air, and a forced convection oven is not disclosed. Moreover, in the examples of Kavesh et al. relied upon in the rejection the yarn that is fed into the heated tube is a yarn that was drawn from a feed yarn, and not a feed yarn itself. Claim 34 calls for the feed yarn to be the yarn that is drawn in the recited process steps. Accordingly, Applicants respectfully submit that Claim 34 is also patentable over Kavesh et al.

Consequently, Applicants submit that all of new claims 25-34 are likewise patentable and should be allowed.

In summary, it is most respectfully submitted that the processes as claimed in claims 1-3, 5-14, 16-22 and 25-34 are not anticipated by the cited prior art and are unobvious thereover. Accordingly, these claims are submitted to be patentable and should be allowed.

Applicants also respectfully request that withdrawn claims 4, 15, 23 and 24 be rejoined with the other claims since generic linking claims should be patentable, as pointed out above.

Applicants therefore respectfully request reconsideration of the previous rejections and allowance of this application. Early notification to that effect is most respectfully solicited.

Should the Examiner believe that a discussion with the undersigned would in any way be of assistance, he is respectfully requested to telephone the undersigned.

Respectfully submitted,
Thomas Y-T. Tam et al.

By: Roger H. Criss
Roger H. Criss
(Their Attorney)
Reg. No. 25,570
(239) 254-0971

Attachments

Roger H. Criss
1462 Via Portofino
Naples, FL 34108